REMARKS

The claimed invention

The present invention is directed to electromechanical devices that comprise substantially planar electroactive ceramic members. These members have grooves or slots formed therein, for example via laser machining. The grooves allow the ceramic member to conform to a curved surface. The slots multiply an electromechanical bending response of a bimorph ceramic member. The grooves or slots may be arranged, for example, in a substantially parallel or a substantially concentric array.

Claim 17 has been amended with this response to clarify that the ridges defined by the grooves or slots remain in electrical connection with one another when the ceramic member is bent to conform to a curved surface.

The prior art

Junger is a U.S. patent disclosing an assortment of transducer shapes. The transducers include various fins or projections designed to increase the inertia of the transducer and thereby reduce the resonant frequency (column 2, lines 28-35). Particular reference is made in the Office Action to Fig. 13, which shows a cantilevered bimorph transducer having wedge-shaped protrusions on its top and bottom surfaces.

Erikson is a U.S. patent disclosing an array of ultrasound transducers. The transducers are electrically separated by bending the array around a mandrel to break them apart: "The bar and window are then bent around a convex mandrel so that the individual elements are fractured one from the other." (column 2, lines 38-39).

Dias is a U.S. patent disclosing an annular array sensor. The sensor is produced by machining annular grooves in the convex side of a shell of piezoelectric material. The cuts "are made almost entirely through the shell [12] so that a small amount of material [20] remains between the cut and the concave side [14]" (abstract, referring to the figures of Dias). The shell itself is "shaped like a section sliced from a spherical shell" (column 5, lines 9-10).

Rejections under 35 U.S.C. § 102

Claims 17, 18, and 20 stand rejected under 35 U.S.C. § 102(b) as anticipated by Erikson. This rejection is respectfully traversed for the reasons set forth below.

As amended, independent claim 17 recites a ceramic electroactive member having grooves defined in a planar surface. The grooves define ridges therebetween, and are adapted and constructed to allow the member to bend to conform to a curved surface, while maintaining an electrical connection between adjacent ridges.

The array of Erikson is bent for the express purpose of electrically isolating adjacent transducers by breaking them apart. "As illustrated in detail **FIG. 9** the bar cracks under each groove **620** to produce a curved array of separate, electroded transducer elements **630** which are retained in place by the front electrode **605** and window **615**" (column 5, line 68-column 6, line 19). In contrast, the integrity of the ceramic member of the present invention is retained during bending (see page 6, lines 5-9; page 7, lines 4-6).

For at least this reason, Applicants submit that the invention of independent claim 17 (and therefore of dependent claims 18 and 20) is not anticipated by Erikson, and request reconsideration and withdrawal of the outstanding rejection.

Rejections under 35 U.S.C. § 103

Claims 19 and 21 stand rejected under 35 U.S.C. § 103(a) as obvious over Erikson or over Erikson in view of Dias, respectively. This rejection is respectfully traversed for the reasons set forth below.

As discussed above, claim 17 (from which claims 19 and 21 depend) recites a bendable electroactive member having ridges defined by grooves in a planar surface, where the ridges remain electrically connected when the member is bent. In contrast, the array of Erikson is designed to break (severing the electrical connection) when bent around a mandrel. This defect in Erikson, as applied to claims 19 and 21, is not remedied by Dias, which is relied upon only to show a concentric groove geometry.

Further, one of ordinary skill in the art would have neither the motivation nor the wherewithal to modify Erikson to achieve the claimed invention. Erikson teaches intentional cracking of a ceramic member in order to create an array of separate transducers, thus teaching away from the invention, in which the member is bent without severing an electrical connection. Further, nothing in Erikson suggests the innovative methods of the invention, which allow one of ordinary skill in the art to manipulate the geometry of the ceramic member to achieve a desired radius of curvature in bending (*e.g.*, the 0.25" radius of curvature recited in claim 19) without destruction of the electrical properties of the device (as by cracking).

For at least these reasons, Applicants submit that the invention of claims 19 and 21 is not obvious in view of the cited art, and request reconsideration and withdrawal of the outstanding rejection.

Claims 22-25 stand rejected under 35 U.S.C. § 103(a) as obvious over Junger in view of Dias. This rejection is respectfully traversed for the reasons set forth below.

Independent claim 22 recites a substantially planar bimorph electroactive ceramic member having slots defined therein to increase its electromechanical bending response. By "slots," it is meant cuts that extend through the thickness of the member, as can most clearly be seen in Figure 5 of the instant application. Both Junger and Dias describe transducers which do not include such cuts through the thickness of the planar member. Thus, these references fail together to teach a material feature of the claimed invention, and cannot be used to make out a *prima facie* case of obviousness.

For at least these reasons, Applicants submit that the invention of claims 22-25 is not obvious in view of the cited art, and request reconsideration and withdrawal of the outstanding rejection.

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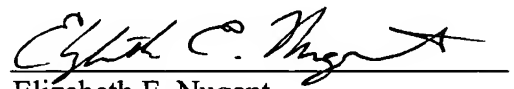
Respectfully submitted,



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